

A STUDY OF THE BEHAVIOURAL PATTERNS OF SIX SPECIES OF BRITISH BUTTERFLIES WHILST IN COPULA

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During the fine summers of 1983 and 1984 I was fortunate to come across six species of butterflies in copula and now will describe their behavioural patterns which varied considerably between each species. I have not come across any literature on this subject and think that few people have been mad enough to study this behaviour which can take several hours in the heat of a mid-day sun.

The grizzled skipper (*Pyrgus malvae* L.)

On 13.v.84 I left for Tennyson Down, Freshwater and at 12.28 p.m. noticed a pair of *Pyrgus malvae* L. in copula which had settled on a dandelion flower at the foot of the down. The male was facing due east and the female due west in hazy sunshine. Their wings were both open to the sun and there was little bodily movement except that the male used its proboscis to feed from the flower on which they had settled. I marked their place and returned 15 minutes later to find that they were still in exactly the same position. Shortly after I returned for the second time, they separated with the male leaving first departing into the distance. The female which was still facing west remained still for a period of 10 minutes before finally departing at 1.10 p.m.

The small white (*Pieris rapae* L.)

At 4.30 p.m. on 12.ix.84 I came across a pair of *Pieris rapae* L. in copula on a holm oak tree at about 15 feet above the ground in the garden. The sun was fully out. The female had its wings open at an angle of 45 degrees whereas the wings of the male were held at 35 degrees. The female faced upwards in an easterly direction and the male to the west towards the ground. There was little wing movement and the only change in the position of the wings was made when the sun went behind the clouds at 4.53 p.m. It was then that the wings became fully closed with the sun completely obscured by clouds and only the wings of the male were at a slight angle of 5 degrees.

It was not until 6.15 p.m. that separation took place when the male flew off leaving the female static and at rest on the stem. After 5 minutes the female flew off and out into the garden on the now overcast evening. This may explain why the Pieridae may be seen flying late in the evening and sometimes at dusk.

The small copper (*Lycaena phlaeas* L.)

At 11.35 a.m. on 26.ix.83 I came across a pair of *Lycaena phlaeas* L. at Spinfish, Freshwater which had just mated and had settled on a dock leaf in the sunshine. Their wings were mostly closed and their abdomens gently pulsated in a rhythmical way. This appeared to be the most lyrical part of their mating experience because after 20 minutes this movement stopped and the insects became more static. They basked in the sun with their wings open for nearly an hour and only moved to a different part of the leaf when disturbed by a cricket which happened to pass close to them.

At 1.15 p.m. they left this leaf and flew several yards over the spinney where they settled on a much larger dock plant growing on the bank. There was more cloud now which did not prevent them from opening their wings. Shortly after 2 p.m. they moved to the underside of the leaf only to reappear on the surface 10 minutes later. Their abdomens were static all this time and they concentrated on sunning themselves.

At 2.40 p.m. mating ceased. They parted and the male flew south leaving its mate with its wings open and quite motionless. After 2 minutes the female left the leaf and flew around the riverside vegetation. They had been in copula for 3 hours 5 minutes.

The chalk hill blue (*Lysandra coridon* Poda)

On 27.vii.84 I noticed a pair of *Lysandra coridon* Poda flying together in the sunshine on Tennyson Down shortly after 10.30 a.m. They displayed a similar courtship behaviour to *Lycaenea phlaeas* L. and it was not long before they mated and came to rest on a short blade of grass. The male faced due south and the female due north. Whilst in copula the male held its wings open intermittently during the first 15 minutes whereas the female only opened its wings once. This was the only occasion when their wings were open to the sun after which time their wings were always closed.

Shortly after they had mated a second male flew by taking an interest in this pair of butterflies and this happened five or six times whilst they were in copula showing that some butterflies assemble even after mating has taken place. At 11.05 a.m. a male settled near this pair and became aggressive by attempting to separate them. This aggression forced the pair from the original resting place causing them to move several yards up the chalkpit and it was several minutes before they finally came to rest on a stone in the main chalkpit bowl after several attempts at finding a place to settle. I noticed that the male carried the female whilst in flight. They finally separated at 12.45 p.m. The male flew off almost immediately after retracting its anal claspers whilst its mate stayed for nearly 3 minutes before flying off leaving two drops of fluid on a blade of grass. A time of 2 hours 5 minutes had elapsed after mating had taken place.

The marbled white (*Melanargia galathea* L.)

On 7.vii.84 I left for Tennyson Down shortly after 10 a.m. and at 10.45 a.m. I observed a pair of *Melanargia galathea* L. in copula. They were making undue movement due to the fact that the female had only just emerged and the wings were not fully stretched or dry. As they were finding difficulty in selecting a place on which to settle I decided to place them on a wild mignonette (*Reseda lutea* L.) plant in the shelter of a chalkpit 20 yards away. The female faced west and the male east although for some time they faced north-west and south-east. I noticed that there was small abdominal movement after they had been in copula for over 45 minutes, and that the male was responsible for this movement. After an hour they became a little restless and moved up the stem. They resettled with the female facing south and the male due west with an angle of 90 degrees being held between their wings. At 12.20 p.m. they separated with the male leaving almost immediately. The female seemed quite content to remain on the plant. As it was slightly crippled I decided to take it back to the spot where pairing had taken place and it quickly settled amongst these surroundings. They had been together for 1 hour 45 minutes.

The meadow brown (*Maniola jurtina* L.)

On 3.vii.84 I decided to go to Tennyson Down during the afternoon and shortly after 3.00 p.m. I noticed a pair of *Maniola jurtina* L. in copula on a blade of grass. The female faced due north and the male due south in bright sunshine and there was no wing movement whatsoever. I accounted for only one movement when this pair of butterflies flew several feet to another blade of grass. I returned at intervals of 15 minutes and finally at 4.25 p.m. they separated. The male flew off almost immediately while the female remained on the grass for 5 minutes before flying off.

SUMMARY

The duration that each species spent in copula varied from 32 minutes for *Pyrgus malvae* L. to 3 hours 5 minutes for *Lycaena phlaeas* L. and these times are given below:

Date	Species	Time	Duration
13.v.84	<i>Pyrgus malvae</i> L.	12.28–1.00 p.m.	32 min
12.ix.84	<i>Pieris rapae</i> L.	4.30–6.15 p.m.	1 h 45 min
26.ix.83	<i>Lycaena phlaeas</i> L.	11.35 a.m.–2.40 p.m.	3 h 5 min
27.vii.84	<i>Lysandra coridon</i> Poda	10.40 a.m.–12.45 p.m.	2 h 5 min
7.vii.84	<i>Melanargia galathea</i> L.	10.45 a.m.–12.20 p.m.	1 h 35 min
3.vii.84	<i>Maniola jurtina</i> L.	3.05–4.25 p.m.	1 h 20 min

After separation the male always left first whilst the female remained static for a few minutes before flying off.

It was noticed that except for *Maniola jurtina* L. it was always the male that carried its mate whilst in flight in copula.

In four out of the six cases mating took place around noon when the sun was at its zenith.

It will be interesting to learn of the behavioural patterns of other species of butterfly. Although I have often seen *Inachis io* L., *Pararge aegeria* L. and *Aglais urticae* L. flying in twos and sometimes threes I have yet to observe them in copula. More study into this subject should pay sound scientific dividends.

